ESOcast Episode 39: A Black Hole's Dinner is Fast Approaching	
00:00 [Visuals start] [Narrator] Not long ago, actually watching something being ripped apart as it falls towards a giant black hole would be science fiction. But this is becoming reality for astronomers using ESO's Very Large Telescope.	Images: Zoom into the central region of the galactic plane. Footage of the cloud moving.
00:26 ESOcast intro This is the ESOcast! Cutting-edge science and life behind the scenes of ESO, the European Southern Observatory. Exploring the ultimate frontier with our host Dr J, a.k.a. Dr Joe Liske.	ESOcast introduction
00:46 [Narrator] Hello, and welcome to the ESOcast. In this episode we will see how science fiction has turned into science fact as astronomers observe the progressive destruction of a cloud of gas that's being pulled in by a supermassive black hole.	VLT footage
01:02 [Narrator] ESO telescopes have been used to track the motion of stars around the giant black hole at the centre of our galaxy for 20 years. This black hole's mass is a hefty four million times that of the Sun, earning it the title of supermassive black hole. Although it is huge, this black hole is currently supplied with little material and is not shining brightly, but this is about to change.	Zoom/Animation of stars orbiting the black hole.
01:32 [Narrator] Using ESO's Very Large Telescope, a team of astronomers has discovered a new object that is heading almost straight towards the black hole at vertiginous speed. The object is not a star, but a cloud of gas.	VLT footage Video of the cloud moving

01:47 [Gillessen] The cloud consists mainly of hydrogen gas, gas which we see anyhow in the galactic centre all over the place. This particular cloud weighs more or less three times the mass of Earth. So it's a rather small and tiny blob only, but it glows very brightly in the light of the stars which are surrounding the cloud.	Video footage Q2 Gillessen [00:18]
02:08 [Narrator] As the astronomers watch, the cloud has been picking up pace as it gets closer to the giant black hole. Its speed has doubled in the last seven years and it is now speeding towards the black hole at more than 8 million km/h.	Simulation video from MPE (first part)
02:24 [Narrator] The astronomers have already seen the cloud's outer layers becoming more and more disrupted over the last few years as it approaches the black hole. But the exciting part is yet to come.	Simulation video – middle part.
02:38 [Gillessen] The Black hole, imagine it sitting here, has a tremendous gravitational force and the cloud, as it comes in, it will be elongated and stretched, it will become essentially like spaghetti. It will be elongated and falling into the black hole.	Video footage Q3 Gillessen [00:13]
02:52 [Genzel] The next few years will be really fantastic and exciting because we are probing the territory. Here this cloud comes and gets disrupted, but now it will begin to interact with the hot gas right around the black hole. We have never seen this before.	Video footage Q2 Genzel [00:15]
03:08 [Narrator] No one knows what will happen next. The cloud will probably heat up and may start to emit powerful X-rays as it gets disrupted. In the end the material will eventually disappear by falling into the black hole. For the scientists, this event is truly a unique chance to probe the hot gas around the black hole.	Simulation video – final part.
03:39 [Genzel] This process of how material gets into the black hole really is not clear to us we don't understand it in any detail. And here in the galactic centre we have an opportunity so to speak to have a probe of this process. How material really gets added to the black hole, and what the physical processes are, how the interactions happen in this very central region. That's a fantastic opportunity.	Q3 Genzel [00:20]

04:03 [Narrator] This is indeed science fiction becoming science fact.	
00:00 [Outro]	ESOcast is produced by ESO, the European Southern Observatory. *ESO, the European Southern Observatory, is the pre-eminent intergovernmental science and technology organisation in astronomy designing, constructing and operating the world's most advanced ground-based telescopes.*

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